

SEQUENCE LISTING

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<120> SCREENING METHOD FOR SUBSTANCES BINDING TO MEROZOITE SURFACE
PROTEIN-1/42

<130> 056222-5089

<140> US 10/561,196

<141> 2005-12-16

<150> PCT/GB2004/002604

<151> 2004-06-18

<150> GB 0314114.0

<151> 2003-06-18

<160> 15

<170> PatentIn Ver. 2.1

<210> 1

<211> 12

<212> PRT

<213> Plasmodium falciparum

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<211> 14

<212> PRT

<213> Plasmodium vivax

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<210> 3

<211> 383

<212> PRT

<213> Plasmodium falciparum

<400> 3

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Glu	Asn	Glu	Tyr	Glu	Val	Leu	Tyr	Leu	Lys	Pro	Leu	Ala	Gly	Val	Tyr	20	25	30	
Arg	Ser	Leu	Lys	Lys	Gln	Leu	Glu	Asn	Asn	Val	Met	Thr	Phe	Asn	Val	35	40	45	
Asn	Val	Lys	Asp	Ile	Leu	Asn	Ser	Arg	Phe	Asn	Lys	Arg	Glu	Asn	Phe	50	55	60	
Lys	Asn	Val	Leu	Glu	Ser	Asp	Leu	Ile	Pro	Tyr	Lys	Asp	Leu	Thr	Ser	65	70	75	80
Ser	Asn	Tyr	Val	Val	Lys	Asp	Pro	Tyr	Lys	Phe	Leu	Asn	Lys	Glu	Lys	85	90	95	
Arg	Asp	Lys	Phe	Leu	Ser	Ser	Tyr	Asn	Tyr	Ile	Lys	Asp	Ser	Ile	Asp	100	105	110	
Thr	Asp	Ile	Asn	Phe	Ala	Asn	Asp	Val	Leu	Gly	Tyr	Tyr	Lys	Ile	Leu	115	120	125	
Ser	Glu	Lys	Tyr	Lys	Ser	Asp	Leu	Asp	Ser	Ile	Lys	Lys	Tyr	Ile	Asn	130	135	140	
Asp	Lys	Gln	Gly	Glu	Asn	Glu	Lys	Tyr	Leu	Pro	Phe	Leu	Asn	Asn	Ile	145	150	155	160
Glu	Thr	Leu	Tyr	Lys	Thr	Val	Asn	Asp	Lys	Ile	Asp	Leu	Phe	Val	Ile	165	170	175	
His	Leu	Glu	Ala	Lys	Val	Leu	Asn	Tyr	Thr	Tyr	Glu	Lys	Ser	Asn	Val	180	185	190	
Glu	Val	Lys	Ile	Lys	Glu	Leu	Asn	Tyr	Leu	Lys	Thr	Ile	Gln	Asp	Lys	195	200	205	
Leu	Ala	Asp	Phe	Lys	Lys	Asn	Asn	Asn	Phe	Val	Gly	Ile	Ala	Asp	Leu	210	215	220	
Ser	Thr	Asp	Tyr	Asn	His	Asn	Asn	Leu	Leu	Thr	Lys	Phe	Leu	Ser	Thr	225	230	235	240
Gly	Met	Val	Phe	Glu	Asn	Leu	Ala	Lys	Thr	Val	Leu	Ser	Asn	Leu	Leu	245	250	255	
Asp	Gly	Asn	Leu	Gln	Gly	Met	Leu	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	260	265	270	
Lys	Lys	Gln	Cys	Pro	Gln	Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu				

275	280	285
Arg Glu Glu Cys Lys Cys Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys 290 295 300		
Pro Phe Trp Glu Leu Cys Val Glu Asn Pro Asn Pro Thr Cys Asn Glu 305 310 315 320		
Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys Thr Glu Glu Asp Ser 325 330 335		
Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro Asp Ser 340 345 350		
Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser Ser Ser Asn Phe Leu Gly 355 360 365		
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 <213> Plasmodium falciparum

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Asn Glu Tyr Asp Val Ile Tyr Leu Lys Pro Leu Ala Gly Val Tyr Arg 20 25 30
Ser Leu Lys Lys Gln Ile Glu Lys Asn Ile Ile Thr Phe Asn Leu Asn 35 40 45
Leu Asn Asp Ile Leu Asn Ser Arg Leu Lys Lys Gly Glu Ala Ile Ser 50 55 60
Val Thr Met Asp Asn Ile Leu Ser Gly Phe Glu Asn Glu Tyr Asp Val 65 70 75 80
Ile Tyr Leu Lys Pro Leu Ala Gly Val Tyr Arg Ser Leu Lys Lys Gln 85 90 95
Ile Glu Lys Asn Ile Ile Thr Phe Asn Leu Asn Leu Asn Asp Ile Leu 100 105 110
Asn Ser Arg Leu Lys Lys Gly Ile Ser Tyr Tyr Glu Lys Val Leu Ala 115 120 125
Lys Tyr Lys Asp Asp Leu Glu Ser Ile Lys Lys Val Ile Lys Glu Glu 130 135 140

Lys	Glu	Lys	Phe	Pro	Ser	Ser	Pro	Pro	Thr	Thr	Pro	Pro	Ser	Pro	Ala	145	150	155	160
Lys	Thr	Asp	Glu	Gln	Lys	Lys	Glu	Ser	Lys	Phe	Leu	Pro	Phe	Leu	Thr	165	170	175	
Asn	Ile	Glu	Thr	Leu	Tyr	Asn	Asn	Leu	Val	Asn	Lys	Ile	Asp	Asp	Tyr	180	185	190	
Leu	Ile	Asn	Leu	Lys	Ala	Lys	Ile	Asn	Asp	Cys	Asn	Val	Glu	Lys	Asp	195	200	205	
Glu	Ala	His	Val	Lys	Ile	Thr	Lys	Leu	Ser	Asp	Leu	Lys	Ala	Ile	Asp	210	215	220	
Asp	Lys	Ile	Asp	Leu	Phe	Lys	Asn	Thr	Asn	Asp	Phe	Glu	Ala	Ile	Lys	225	230	235	240
Lys	Leu	Ile	Asn	Asp	Asp	Thr	Lys	Lys	Asp	Met	Leu	Gly	Lys	Leu	Leu	245	250	255	
Ser	Thr	Gly	Leu	Val	Gln	Asn	Phe	Pro	Asn	Thr	Ile	Ile	Ser	Lys	Leu	260	265	270	
Ile	Glu	Gly	Lys	Phe	Gln	Asp	Met	Leu	Asn	Ile	Ser	Gln	His	Gln	Cys	275	280	285	
Val	Lys	Lys	Gln	Cys	Pro	Glu	Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	290	295	300	
Glu	Arg	Glu	Glu	Cys	Lys	Cys	Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	305	310	315	320
Lys	Cys	Val	Glu	Asn	Pro	Asn	Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	325	330	335	
Cys	Asp	Ala	Asp	Ala	Thr	Cys	Thr	Glu	Glu	Asp	Ser	Gly	Ser	Ser	Arg	340	345	350	
Lys	Lys	Ile	Thr	Cys	Glu	Cys	Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	355	360	365	
Asp	Gly	Ile	Phe	Cys	Ser	Ser	Ser	Asn	Phe	Leu	Gly	Ile	Ser	Phe	Leu	370	375	380	
Leu	Ile	Leu	Met	Leu	Ile	Leu	Tyr	Ser	Phe	Ile						385	390	395	

<210> 5

<211> 396

<212> PRT

<213> Plasmodium falciparum

<400> 5

Gly	Glu	Ala	Ile	Ser	Val	Thr	Met	Asp	Asn	Ile	Leu	Ser	Gly	Phe	Glu	1	5	10	15
Asn	Glu	Tyr	Asp	Val	Ile	Tyr	Leu	Lys	Pro	Leu	Ala	Gly	Val	Tyr	Arg	20	25	30	
Ser	Leu	Lys	Lys	Gln	Ile	Glu	Lys	Asn	Ile	Phe	Thr	Phe	Asn	Leu	Asn	35	40	45	
Leu	Asn	Asp	Ile	Leu	Asn	Ser	Arg	Leu	Lys	Lys	Arg	Lys	Tyr	Phe	Leu	50	55	60	
Asp	Val	Leu	Glu	Ser	Asp	Leu	Met	Gln	Phe	Lys	His	Ile	Ser	Ser	Asn	65	70	75	80
Glu	Tyr	Ile	Ile	Glu	Asp	Ser	Phe	Lys	Leu	Leu	Asn	Ser	Glu	Gln	Lys	85	90	95	
Asn	Thr	Leu	Leu	Lys	Ser	Tyr	Lys	Tyr	Ile	Lys	Glu	Ser	Val	Glu	Asn	100	105	110	
Asp	Ile	Lys	Phe	Ala	Gln	Glu	Gly	Ile	Ser	Tyr	Tyr	Glu	Lys	Val	Leu	115	120	125	
Ala	Lys	Tyr	Lys	Asp	Asp	Leu	Glu	Ser	Ile	Lys	Lys	Val	Ile	Lys	Glu	130	135	140	
Glu	Lys	Glu	Lys	Phe	Pro	Ser	Ser	Pro	Pro	Thr	Thr	Pro	Pro	Ser	Pro	145	150	155	160
Ala	Lys	Thr	Asp	Glu	Gln	Lys	Lys	Glu	Ser	Lys	Phe	Leu	Pro	Phe	Leu	165	170	175	
Thr	Asn	Ile	Glu	Thr	Leu	Tyr	Asn	Asn	Leu	Val	Asn	Lys	Ile	Asp	Asp	180	185	190	
Tyr	Leu	Ile	Asn	Leu	Lys	Ala	Lys	Ile	Asn	Asp	Cys	Asn	Val	Glu	Lys	195	200	205	
Asp	Glu	Ala	His	Val	Lys	Ile	Thr	Lys	Leu	Ser	Asp	Leu	Lys	Ala	Ile	210	215	220	
Asp	Asp	Lys	Ile	Asp	Leu	Phe	Lys	Asn	His	Asn	Asp	Phe	Glu	Ala	Ile	225	230	235	240
Lys	Lys	Leu	Ile	Asn	Asp	Asp	Thr	Lys	Lys	Asp	Met	Leu	Gly	Lys	Leu	245	250	255	
Leu	Ser	Thr	Gly	Leu	Val	Gln	Asn	Phe	Pro	Asn	Thr	Ile	Ile	Ser	Lys	260	265	270	

Leu Ile Glu Gly Lys Phe Gln Asp Met Leu Asn Ile Ser Gln His Gln
275 280 285

Cys Val Lys Lys Gln Cys Pro Glu Asn Ser Gly Cys Phe Arg His Leu
290 295 300

Asp Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn Tyr Lys Gln Glu Gly
305 310 315 320

Asp Lys Cys Val Glu Asn Pro Asn Pro Thr Cys Asn Glu Asn Asn Gly
325 330 335

Gly Cys Asp Ala Asp Ala Lys Cys Thr Glu Glu Asp Ser Gly Ser Asn
340 345 350

Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro Asp Ser Tyr Pro Leu
355 360 365

Phe Asp Gly Ile Phe Cys Ser Ser Ser Asn Phe Leu Gly Ile Ser Phe
370 375 380

Leu Leu Ile Leu Met Leu Ile Leu Tyr Ser Phe Ile
385 390 395

<210> 6

<211> 396

<212> PRT

<213> Plasmodium falciparum

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Asn Glu Tyr Asp Val Ile Tyr Leu Lys Pro Leu Ala Gly Val Tyr Arg
20 25 30

Ser Leu Lys Lys Gln Ile Glu Lys Asn Ile Phe Thr Phe Asn Leu Asn
35 40 45

Leu Asn Asp Ile Leu Asn Ser Arg Leu Lys Lys Arg Lys Tyr Phe Leu
50 55 60

Asp Val Leu Glu Ser Asp Leu Met Gln Phe Lys His Ile Ser Ser Asn
65 70 75 80

Glu Tyr Ile Ile Glu Asp Ser Phe Lys Leu Leu Asn Ser Glu Gln Lys
85 90 95

Asn Thr Leu Leu Lys Ser Tyr Lys Tyr Ile Lys Glu Ser Val Glu Asn
100 105 110

Asp Ile Lys Phe Ala Gln Glu Gly Ile Ser Tyr Tyr Glu Lys Val Leu

115	120	125
Ala Lys Tyr Lys Asp Asp Leu Glu Ser Ile Lys Lys Val Ile Lys Glu 130 135 140		
Glu Lys Glu Lys Phe Pro Ser Ser Pro Pro Thr Thr Pro Pro Ser Pro 145 150 155 160		
Ala Lys Thr Asp Glu Gln Lys Lys Glu Ser Lys Phe Leu Pro Phe Leu 165 170 175		
Thr Asn Ile Glu Thr Leu Tyr Asn Asn Leu Val Asn Lys Ile Asp Asp 180 185 190		
Tyr Leu Ile Asn Leu Lys Ala Lys Ile Asn Asp Cys Asn Val Glu Lys 195 200 205		
Asp Glu Ala His Val Lys Ile Thr Lys Leu Ser Asp Leu Lys Ala Ile 210 215 220		
Asp Asp Lys Ile Asp Leu Phe Lys Asn His Asn Asp Phe Asp Ala Ile 225 230 235 240		
Lys Lys Leu Ile Asn Asp Asp Thr Lys Lys Asp Met Leu Gly Lys Leu 245 250 255		
Leu Ser Thr Gly Leu Val Gln Asn Phe Pro Asn Thr Ile Ile Ser Lys 260 265 270		
Leu Ile Glu Gly Lys Phe Gln Asp Met Leu Asn Ile Ser Gln His Gln 275 280 285		
Cys Val Lys Lys Gln Cys Pro Glu Asn Ser Gly Cys Phe Arg His Leu 290 295 300		
Asp Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn Tyr Lys Gln Glu Gly 305 310 315 320		
Asp Lys Cys Val Glu Asn Pro Asn Pro Thr Cys Asn Glu Asn Asn Gly 325 330 335		
Gly Cys Asp Ala Asp Ala Lys Cys Thr Glu Glu Asp Ser Gly Ser Asn 340 345 350		
Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro Asp Ser Tyr Pro Leu 355 360 365		
Phe Asp Gly Ile Phe Cys Ser Ser Ser Asn Phe Leu Gly Ile Ser Phe 370 375 380		
Leu Leu Ile Leu Met Leu Ile Leu Tyr Ser Phe Ile 385 390 395		

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 <213> Plasmodium falciparum

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 20 25 30
 Ser Leu Lys Lys Gln Ile Glu Lys Asn Ile Ile Thr Phe Asn Leu Asn
 35 40 45
 Leu Asn Asp Ile Leu Asn Ser Arg Leu Lys Lys Arg Lys Tyr Phe Leu
 50 55 60
 Asp Val Leu Glu Ser Asp Leu Met Gln Phe Lys His Ile Ser Ser Asn
 65 70 75 80
 Glu Tyr Ile Ile Glu Asp Ser Phe Lys Leu Leu Asn Ser Glu Gln Lys
 85 90 95
 Asn Thr Leu Leu Lys Ser Tyr Lys Tyr Ile Lys Glu Ser Val Glu Asn
 100 105 110
 Asp Ile Lys Phe Ala Gln Glu Gly Ile Ser Tyr Tyr Glu Lys Val Leu
 115 120 125
 Ala Lys Tyr Lys Asp Asp Leu Glu Ser Ile Lys Lys Val Ile Lys Glu
 130 135 140
 Glu Lys Glu Lys Phe Pro Ser Ser Pro Pro Thr Thr Pro Pro Ser Pro
 145 150 155 160
 Ala Lys Thr Asp Glu Gln Lys Lys Glu Ser Lys Phe Leu Pro Phe Leu
 165 170 175
 Thr Asn Ile Glu Thr Leu Tyr Asn Asn Leu Val Asn Lys Ile Asp Asp
 180 185 190
 Tyr Leu Ile Asn Leu Lys Ala Lys Ile Asn Asp Cys Asn Val Glu Lys
 195 200 205
 Asp Glu Ala His Val Lys Ile Thr Lys Leu Ser Asp Leu Lys Ala Ile
 210 215 220
 Asp Asp Lys Ile Asp Leu Phe Lys Asn Thr Asn Asp Phe Glu Ala Ile
 225 230 235 240
 Lys Lys Leu Ile Asn Asp Asp Thr Lys Lys Asp Met Leu Gly Lys Leu
 245 250 255

Leu Ser Thr Gly Leu Val Gln Asn Phe Pro Asn Thr Ile Ile Ser Lys
 260 265 270
 Leu Ile Glu Gly Lys Phe Gln Asp Met Leu Asn Ile Ser Gln His Gln
 275 280 285
 Cys Val Lys Lys Gln Cys Pro Glu Asn Ser Gly Cys Phe Arg His Leu
 290 295 300
 Asp Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn Tyr Lys Gln Glu Gly
 305 310 315 320
 Asp Lys Cys Val Glu Asn Pro Asn Pro Thr Cys Asn Glu Asn Asn Gly
 325 330 335
 Gly Cys Asp Ala Asp Ala Thr Cys Thr Glu Glu Asp Ser Gly Ser Ser
 340 345 350
 Arg Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro Asp Ser Tyr Pro Leu
 355 360 365
 Phe Asp Gly Ile Phe Cys Ser Ser Ser Asn Phe Leu Gly Ile Ser Phe
 370 375 380
 Leu Leu Ile Leu Met Leu Ile Leu Tyr Ser Phe Ile
 385 390 395

<210> 8
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 <213> Plasmodium falciparum

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 20 25 30
 Ser Leu Lys Lys Gln Ile Glu Lys Asn Ile Phe Thr Phe Asn Leu Asn
 35 40 45
 Leu Asn Asp Ile Leu Asn Ser Arg Leu Lys Lys Arg Lys Tyr Phe Leu
 50 55 60
 Asp Val Leu Glu Ser Asp Leu Met Gln Phe Lys His Ile Ser Ser Asn
 65 70 75 80
 Glu Tyr Ile Ile Glu Asp Ser Phe Lys Leu Leu Asn Ser Glu Gln Lys
 85 90 95

Asn	Thr	Leu	Leu	Lys	Ser	Tyr	Lys	Tyr	Ile	Lys	Glu	Ser	Val	Glu	Asn	100	105	110	
Asp	Ile	Lys	Phe	Ala	Gln	Glu	Gly	Ile	Ser	Tyr	Tyr	Glu	Lys	Val	Leu	115	120	125	
Ala	Lys	Tyr	Lys	Asp	Asp	Leu	Glu	Ser	Ile	Lys	Lys	Val	Ile	Lys	Glu	130	135	140	
Glu	Lys	Glu	Lys	Phe	Pro	Ser	Ser	Pro	Pro	Thr	Thr	Pro	Pro	Ser	Pro	145	150	155	160
Ala	Lys	Thr	Asp	Glu	Gln	Lys	Lys	Glu	Ser	Lys	Phe	Leu	Pro	Phe	Leu	165	170	175	
Thr	Asn	Ile	Glu	Thr	Leu	Tyr	Asn	Asn	Leu	Val	Asn	Lys	Ile	Asp	Asp	180	185	190	
Tyr	Leu	Ile	Asn	Leu	Lys	Ala	Lys	Ile	Asn	Asp	Cys	Asn	Val	Glu	Lys	195	200	205	
Asp	Glu	Ala	His	Val	Lys	Ile	Thr	Lys	Leu	Ser	Asp	Leu	Lys	Ala	Ile	210	215	220	
Asp	Asp	Lys	Ile	Asp	Leu	Phe	Lys	Asn	Pro	Tyr	Asp	Phe	Glu	Ala	Ile	225	230	235	240
Lys	Lys	Leu	Ile	Asn	Asp	Asp	Thr	Lys	Lys	Asp	Met	Leu	Gly	Lys	Leu	245	250	255	
Leu	Ser	Thr	Gly	Leu	Val	Gln	Asn	Phe	Pro	Asn	Thr	Ile	Ile	Ser	Lys	260	265	270	
Leu	Ile	Glu	Gly	Lys	Phe	Gln	Asp	Met	Leu	Asn	Ile	Ser	Gln	His	Gln	275	280	285	
Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	290	295	300	
Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys	Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	305	310	315	320
Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn	Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	325	330	335	
Gly	Cys	Asp	Ala	Asp	Ala	Thr	Cys	Thr	Glu	Glu	Asp	Ser	Gly	Ser	Ser	340	345	350	
Arg	Lys	Lys	Ile	Thr	Cys	Glu	Cys	Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	355	360	365	
Phe	Asp	Gly	Ile	Phe	Cys	Ser	Ser	Ser	Asn	Phe	Leu	Gly	Ile	Ser	Phe	370	375	380	

Leu Leu Ile Leu Met Leu Ile Leu Tyr Ser Phe Ile
385 390 395

<210> 9

<211> 397

<212> PRT

<213> Plasmodium vivax

<400> 9

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Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu Ala Gly Met Tyr Lys
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Lys Ile Lys Lys Gln Leu Glu Asn His Val Asn Ala Phe Asn Thr Asn
35 40 45

Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys Arg Asn Tyr Phe Leu
50 55 60

Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys Tyr Ser Pro Ser Gly
65 70 75 80

Glu Tyr Ile Ile Lys Asp Pro Tyr Lys Leu Leu Asp Leu Glu Lys Lys
85 90 95

Lys Lys Leu Leu Gly Ser Tyr Lys Tyr Ile Gly Ala Ser Ile Asp Lys
100 105 110

Asp Leu Gly Thr Ala Asn Asp Gly Val Asn Tyr Tyr Asn Lys Met Gly
115 120 125

Glu Leu Tyr Lys Thr His Leu Thr Ala Val Asn Glu Glu Val Lys Lys
130 135 140

Val Glu Ala Asp Ile Lys Ala Glu Asp Asp Lys Ile Lys Lys Ile Gly
145 150 155 160

Ser Asp Ser Thr Lys Thr Thr Glu Lys Thr Gln Ser Met Ala Lys Lys
165 170 175

Ala Glu Leu Glu Lys Tyr Leu Pro Phe Leu Asn Ser Leu Gln Lys Glu
180 185 190

Tyr Glu Ser Leu Val Ser Lys Val Asn Thr Tyr Thr Asp Asn Leu Lys
195 200 205

Lys Val Ile Asn Asn Cys Gln Leu Glu Lys Lys Glu Ala Glu Ile Thr
210 215 220

Val Lys Lys Leu Gln Asp Tyr Asn Lys Met Asp Glu Lys Leu Glu Glu

225		230		235		240
Tyr Lys Lys Ser Glu Lys Lys Asn Glu Val Lys Ser Ser Gly Leu Leu						
	245			250		255
Glu Lys Leu Met Lys Ser Lys Leu Ile Lys Glu Asn Glu Ser Lys Glu						
	260		265		270	
Ile Leu Ser Gln Leu Leu Asn Val Gln Thr Gln Leu Leu Thr Met Ser						
	275		280		285	
Ser Glu His Thr Cys Ile Asp Thr Asn Val Pro Asp Asn Ala Ala Cys						
	290		295		300	
Tyr Arg Tyr Leu Asp Gly Met Glu Glu Trp Arg Cys Leu Leu Thr Phe						
305		310		315		320
Lys Glu Glu Gly Gly Lys Cys Val Pro Gly Ser Asn Val Thr Cys Lys						
	325		330			335
Asp Asn Asn Gly Gly Cys Ala Pro Glu Ala Glu Cys Lys Met Thr Asp						
	340		345			350
Ser Asn Lys Ile Val Cys Lys Cys Thr Lys Glu Gly Ser Glu Pro Leu						
	355		360		365	
Phe Glu Gly Val Phe Cys Ser Ser Ser Ser Phe Leu Ser Leu Ser Phe						
	370		375		380	
Leu Leu Leu Met Leu Leu Phe Leu Leu Cys Met Glu Leu						
385		390		395		

<210> 10

<211> 397

<212> PRT

<213> Plasmodium vivax

<400> 10

Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Leu Val Pro Ala Gly Ile															
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Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu Ala Gly Met Tyr Lys															
	20					25					30				
Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn Ala Phe Asn Thr Asn															
	35					40					45				
Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys Arg Asn Tyr Phe Leu															
	50				55				60						
Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys Tyr Ser Ser Ser Gly															
65				70				75						80	

Glu	Tyr	Ile	Ile	Lys	Asp	Pro	Tyr	Lys	Leu	Leu	Asp	Leu	Glu	Lys	Lys	85	90	95	
Lys	Lys	Leu	Ile	Gly	Ser	Tyr	Lys	Tyr	Ile	Gly	Ala	Ser	Ile	Asp	Met	100	105	110	
Asp	Leu	Ala	Thr	Ala	Asn	Asp	Gly	Val	Thr	Tyr	Tyr	Asn	Lys	Met	Gly	115	120	125	
Glu	Leu	Tyr	Lys	Thr	His	Leu	Asp	Gly	Val	Lys	Thr	Glu	Ile	Lys	Lys	130	135	140	
Val	Glu	Asp	Asp	Ile	Lys	Lys	Gln	Asp	Glu	Glu	Leu	Lys	Lys	Leu	Gly	145	150	155	160
Asn	Val	Asn	Ser	Gln	Asp	Ser	Lys	Lys	Asn	Glu	Phe	Ile	Ala	Lys	Lys	165	170	175	
Ala	Glu	Leu	Glu	Lys	Tyr	Leu	Pro	Phe	Leu	Asn	Ser	Ile	Gln	Lys	Glu	180	185	190	
Tyr	Ser	Glu	Leu	Val	Ser	Lys	Val	Asn	Thr	Tyr	Thr	Asp	Asn	Leu	Lys	195	200	205	
Lys	Val	Ile	Asn	Asn	Cys	Gln	Leu	Glu	Lys	Lys	Glu	Ala	Glu	Ile	Thr	210	215	220	
Val	Lys	Lys	Leu	Gln	Asp	Tyr	Asn	Lys	Met	Asp	Glu	Lys	Leu	Glu	Glu	225	230	235	240
Tyr	Lys	Lys	Ser	Glu	Lys	Lys	Asn	Glu	Val	Lys	Ser	Ser	Gly	Leu	Leu	245	250	255	
Glu	Lys	Leu	Met	Lys	Ser	Lys	Leu	Ile	Lys	Glu	Asn	Glu	Ser	Lys	Glu	260	265	270	
Ile	Leu	Ser	Gln	Leu	Leu	Asn	Val	Gln	Thr	Gln	Leu	Leu	Thr	Met	Ser	275	280	285	
Ser	Glu	His	Thr	Cys	Ile	Asp	Thr	Asn	Val	Pro	Asp	Asn	Ala	Ala	Cys	290	295	300	
Tyr	Arg	Tyr	Leu	Asp	Gly	Thr	Glu	Glu	Trp	Arg	Cys	Leu	Leu	Thr	Phe	305	310	315	320
Lys	Glu	Glu	Gly	Gly	Lys	Cys	Val	Pro	Ala	Ser	Asn	Val	Thr	Cys	Lys	325	330	335	
Asp	Asn	Asn	Gly	Gly	Cys	Ala	Pro	Glu	Ala	Glu	Cys	Lys	Met	Thr	Asp	340	345	350	
Ser	Asn	Lys	Ile	Val	Cys	Lys	Cys	Thr	Lys	Glu	Gly	Ser	Glu	Pro	Leu	355	360	365	

Phe Glu Gly Val Phe Cys Ser Ser Ser Ser Phe Leu Ser Leu Ser Phe
370 375 380

Leu Leu Leu Met Leu Leu Phe Leu Leu Cys Met Glu Leu
385 390 395

<210> 11
<211> 397
<212> PRT
<213> Plasmodium cynomolgi

<400> 11
Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Leu Val Pro Ala Gly Ile
1 5 10 15

Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu Ala Gly Met Tyr Lys
20 25 30

Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn Ala Phe Asn Thr Asn
35 40 45

Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys Arg Asn Tyr Phe Leu
50 55 60

Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys Tyr Ser Ser Ser Gly
65 70 75 80

Glu Tyr Ile Ile Lys Asp Pro Tyr Lys Leu Leu Asp Leu Glu Lys Lys
85 90 95

Lys Lys Leu Ile Gly Ser Tyr Lys Tyr Ile Gly Ala Ser Ile Asp Met
100 105 110

Asp Leu Ala Thr Ala Asn Asp Gly Val Thr Tyr Tyr Asn Lys Met Gly
115 120 125

Glu Leu Tyr Lys Thr His Leu Asp Gly Val Lys Thr Glu Ile Lys Lys
130 135 140

Val Glu Asp Asp Ile Lys Lys Gln Asp Glu Glu Leu Lys Lys Leu Gly
145 150 155 160

Asn Val Asn Ser Gln Asp Ser Lys Lys Asn Glu Phe Ile Ala Lys Lys
165 170 175

Ala Glu Leu Glu Lys Tyr Leu Pro Phe Leu Asn Ser Ile Gln Lys Glu
180 185 190

Tyr Ser Glu Leu Val Ser Lys Val Asn Thr Tyr Thr Asp Asn Leu Lys
195 200 205

Lys	Val	Ile	Asn	Asn	Cys	Gln	Leu	Glu	Lys	Lys	Glu	Ala	Glu	Ile	Thr
210						215					220				
Val	Lys	Lys	Leu	Gln	Asp	Tyr	Asn	Lys	Met	Asp	Glu	Lys	Leu	Glu	Glu
225					230					235					240
Tyr	Lys	Lys	Ser	Glu	Lys	Lys	Asn	Glu	Val	Lys	Ser	Ser	Gly	Leu	Leu
				245					250					255	
Glu	Lys	Leu	Met	Lys	Ser	Lys	Leu	Ile	Lys	Glu	Asn	Glu	Ser	Lys	Glu
			260					265					270		
Ile	Leu	Ser	Gln	Leu	Leu	Asn	Val	Gln	Thr	Gln	Leu	Leu	Thr	Met	Ser
		275					280						285		
Ser	Glu	His	Thr	Cys	Ile	Asp	Thr	Asn	Val	Pro	Asp	Asn	Ala	Ala	Cys
	290					295					300				
Tyr	Arg	Tyr	Leu	Asp	Gly	Thr	Glu	Glu	Trp	Arg	Cys	Leu	Leu	Thr	Phe
305					310					315					320
Lys	Glu	Glu	Gly	Gly	Lys	Cys	Val	Pro	Ala	Ser	Asn	Val	Thr	Cys	Lys
				325					330					335	
Asp	Asn	Asn	Gly	Gly	Cys	Ala	Pro	Glu	Ala	Glu	Cys	Lys	Met	Thr	Asp
			340					345					350		
Ser	Asn	Lys	Ile	Val	Cys	Lys	Cys	Thr	Lys	Glu	Gly	Ser	Glu	Pro	Leu
		355					360					365			
Phe	Glu	Gly	Val	Phe	Cys	Ser	Ser	Ser	Ser	Phe	Leu	Ser	Leu	Ser	Phe
	370					375					380				
Leu	Leu	Leu	Met	Leu	Leu	Phe	Leu	Leu	Cys	Met	Glu	Leu			
385					390					395					

<210> 12
 <211> 327
 <212> PRT
 <213> Plasmodium knowlesi

<400> 12

Lys	Lys	Gln	Leu	Glu	Asn	His	Val	Ala	Ala	Phe	Asn	Thr	Asn	Ile	Thr
1					5				10					15	
Asp	Met	Leu	Asp	Ser	Arg	Leu	Lys	Lys	Arg	Asn	Tyr	Phe	Leu	Asp	Ala
			20					25					30		
Leu	Asp	Ser	Glu	Leu	Asn	Pro	Phe	Lys	Tyr	Ser	Ser	Ser	Gly	Glu	Tyr
		35					40					45			
Ile	Ile	Lys	Asp	Pro	Tyr	Lys	Leu	Leu	Asp	Leu	Glu	Gln	Lys	Lys	Lys

50					55					60					
Leu	Leu	Gly	Ser	Tyr	Gln	Tyr	Ile	Gly	Ala	Ser	Val	Asp	Lys	Asp	Leu
65					70					75					80
Ile	Thr	Ala	Lys	Asp	Gly	Met	Glu	Tyr	Tyr	Lys	Lys	Met	Gly	Glu	Leu
				85					90					95	
Tyr	Lys	Gln	His	Leu	Glu	Ala	Val	Asn	Ala	Gln	Ile	Lys	Glu	Ile	Glu
			100					105					110		
Ala	Ser	Val	Pro	Gly	Glu	Gln	Ser	Gln	Leu	Asn	Ala	Gln	Lys	Glu	Glu
		115					120					125			
Leu	Lys	Lys	Tyr	Leu	Pro	Phe	Leu	Asn	Ser	Ile	Gln	Lys	Glu	Tyr	Glu
	130					135					140				
Ser	Leu	Val	Asn	Met	Ala	His	Thr	Tyr	Lys	Glu	Asn	Leu	Lys	Lys	Phe
145				150						155					160
Ile	Asn	Asn	Cys	Gln	Met	Glu	Lys	Lys	Glu	Thr	Glu	Ile	Ile	Val	Lys
			165						170					175	
Lys	Leu	Glu	Asp	Tyr	Thr	Lys	Ile	Asp	Glu	Asn	Leu	Glu	Ile	Tyr	Lys
			180					185					190		
Lys	Ser	Lys	Lys	Glu	Ser	Asp	Val	Arg	Ser	Ser	Gly	Leu	Leu	Glu	Lys
		195					200					205			
Leu	Lys	Asn	Ser	Lys	Leu	Ile	Asn	Glu	Glu	Val	Ser	Lys	Lys	Val	Leu
	210					215					220				
Ser	Gln	Leu	Leu	Asn	Val	Gln	Thr	Gln	Met	Leu	Asn	Met	Ser	Ser	Ala
225				230						235					240
His	Lys	Cys	Ile	Asp	Thr	Asn	Val	Pro	Glu	Asn	Ala	Ala	Cys	Tyr	Arg
			245						250					255	
Tyr	Leu	Asp	Gly	Thr	Glu	Glu	Trp	Arg	Cys	Leu	Leu	Gly	Phe	Lys	Glu
		260						265					270		
Val	Gly	Gly	Lys	Cys	Val	Pro	Ala	Ser	Ile	Thr	Cys	Glu	Glu	Asn	Asn
	275						280					285			
Gly	Gly	Cys	Ala	Pro	Glu	Ala	Glu	Cys	Thr	Met	Glu	Asp	Lys	Lys	Glu
	290					295					300				
Val	Glu	Cys	Lys	Cys	Thr	Lys	Glu	Gly	Ser	Glu	Pro	Leu	Phe	Glu	Gly
305				310					315					320	
Val	Phe	Cys	Ser	Ser	Ser	Ser									
				325											

<210> 13
 <211> 381
 <212> PRT
 <213> Plasmodium yoelli

<400> 13
 Gly Gln Ser Glu Asp Ala Pro Glu Lys Asp Ile Leu Ser Glu Phe Thr
 1 5 10 15
 Asn Glu Ser Leu Tyr Val Tyr Thr Lys Arg Leu Gly Ser Thr Tyr Lys
 20 25 30
 Ser Leu Lys Lys His Met Leu Arg Glu Phe Ser Thr Ile Lys Glu Asp
 35 40 45
 Met Thr Asn Gly Leu Asn Asn Lys Ser Gln Lys Arg Asn Asp Phe Leu
 50 55 60
 Glu Val Leu Ser His Glu Leu Asp Leu Phe Lys Asp Leu Ser Thr Asn
 65 70 75 80
 Lys Tyr Val Ile Arg Asn Pro Tyr Gln Leu Leu Asp Asn Asp Lys Lys
 85 90 95
 Asp Lys Gln Ile Val Asn Leu Lys Tyr Ala Thr Lys Gly Ile Asn Glu
 100 105 110
 Asp Ile Glu Thr Thr Thr Asp Gly Ile Lys Phe Phe Asn Lys Met Val
 115 120 125
 Glu Leu Tyr Asn Thr Gln Leu Ala Ala Val Lys Glu Gln Ile Ala Thr
 130 135 140
 Ile Glu Ala Glu Thr Asn Asp Thr Asn Lys Glu Glu Lys Lys Lys Tyr
 145 150 155 160
 Ile Pro Ile Leu Glu Asp Leu Lys Gly Leu Tyr Glu Thr Val Ile Gly
 165 170 175
 Gln Ala Glu Glu Tyr Ser Glu Glu Leu Gln Asn Arg Leu Asp Asn Tyr
 180 185 190
 Lys Asn Glu Lys Ala Glu Phe Glu Ile Leu Thr Lys Asn Leu Glu Lys
 195 200 205
 Tyr Ile Gln Ile Asp Glu Lys Leu Asp Glu Phe Val Glu His Ala Glu
 210 215 220
 Asn Asn Lys His Ile Ala Ser Ile Ala Leu Asn Asn Leu Asn Lys Ser
 225 230 235 240
 Gly Leu Val Gly Glu Gly Glu Ser Lys Lys Ile Leu Ala Lys Met Leu
 245 250 255

Asn Met Asp Gly Met Asp Leu Leu Gly Val Asp Pro Lys His Val Cys
260 265 270

Val Asp Thr Arg Asp Ile Pro Lys Asn Ala Gly Cys Phe Arg Asp Asp
275 280 285

Asn Gly Thr Glu Glu Trp Arg Cys Leu Leu Gly Tyr Lys Lys Gly Glu
290 295 300

Gly Asn Thr Cys Val Glu Asn Asn Asn Pro Thr Cys Asp Ile Asn Asn
305 310 315 320

Gly Gly Cys Asp Pro Thr Ala Ser Cys Gln Asn Ala Glu Ser Thr Glu
325 330 335

Asn Ser Lys Lys Ile Ile Cys Thr Cys Lys Glu Pro Thr Pro Asn Ala
340 345 350

Tyr Tyr Glu Gly Val Phe Cys Ser Ser Ser Ser Phe Met Gly Leu Ser
355 360 365

Ile Leu Leu Ile Ile Thr Leu Ile Val Phe Asn Ile Phe
370 375 380

<210> 14

<211> 378

<212> PRT

<213> Plasmodium berghei

<400> 14

Gly Gln Ser Glu Asn Ala Gln Glu Lys Asn Ile Leu Glu Ala Phe Lys
1 5 10 15

Asn Glu Ser Glu Tyr Leu Tyr Ala Arg Ser Leu Gly Ile Thr Tyr Lys
20 25 30

Ser Leu Lys Lys His Met Ile Arg Glu Phe Ser Thr Ile Lys Glu Asp
35 40 45

Met Thr Thr Gly Leu Asn Asn Lys Leu Gln Lys Arg Asn Asp Phe Leu
50 55 60

Glu Val Leu Asn His Glu Leu Asp Leu Phe Lys Asp Leu Ser Thr Asn
65 70 75 80

Lys Tyr Val Ile Arg Asn Pro Tyr Gln Leu Leu Asp Asn Asp Lys Lys
85 90 95

Asp Lys Gln Ile Val Asn Leu Lys Tyr Ala Ala Lys Gly Val Asn Glu
100 105 110

Asp	Ile	Glu	Thr	Thr	Ala	Asp	Gly	Ile	Lys	Phe	Phe	Asn	Lys	Met	Ile
		115					120					125			
Glu	Leu	Tyr	Lys	Ile	Gln	Leu	Ala	Ala	Val	Lys	Glu	Gln	Ile	Asp	Ala
	130					135					140				
Ile	Glu	Ala	Ala	Thr	Thr	Asp	Lys	Asp	Glu	Lys	Lys	Lys	Tyr	Val	Pro
145					150					155					160
Ile	Phe	Glu	Asp	Leu	Lys	Gly	Leu	Tyr	Glu	Thr	Ile	Leu	Gly	Gln	Ser
				165					170					175	
Glu	Glu	Tyr	Ile	Glu	Val	Leu	Gln	Asn	Arg	Leu	Asp	Ser	Tyr	Lys	Asn
			180					185					190		
Glu	Lys	Thr	Glu	Phe	Glu	Ile	Leu	Thr	Lys	Asn	Leu	Glu	Thr	Tyr	Ile
		195					200					205			
Lys	Ile	Asp	Glu	Lys	Leu	Glu	Asn	Phe	Val	Glu	Asn	Ala	Glu	Asn	Asn
	210					215					220				
Lys	His	Ile	Ala	Ser	Ile	Ala	Leu	Asn	Asn	Leu	Asn	Lys	Ser	Gly	Leu
225					230					235					240
Val	Gly	Glu	Gly	Glu	Ser	Lys	Lys	Ile	Leu	Ala	Lys	Met	Leu	Asn	Met
				245					250					255	
Asp	Ser	Met	Asp	Leu	Leu	Gly	Ile	Asp	Pro	Lys	His	Val	Cys	Ile	Asn
			260					265					270		
Thr	Arg	Asp	Ile	Pro	Ala	Asn	Ala	Gly	Cys	Phe	Arg	Tyr	Asp	Asn	Gly
		275					280					285			
Asn	Glu	Glu	Trp	Arg	Cys	Leu	Leu	Gly	Tyr	Lys	Lys	Asn	Asn	Asn	Thr
	290					295					300				
Cys	Ile	Glu	Asp	Ser	Asn	Pro	Thr	Cys	Gly	Asn	Asn	Asn	Gly	Gly	Cys
305					310					315					320
Asp	Pro	Thr	Ala	Gly	Cys	Gln	Thr	Ala	Glu	Asn	Arg	Glu	Asn	Ser	Lys
				325					330					335	
Lys	Ile	Ile	Cys	Thr	Cys	Lys	Glu	Pro	Thr	Pro	Asn	Ala	Tyr	Tyr	Asp
			340					345					350		
Gly	Val	Phe	Cys	Ser	Ser	Ser	Ser	Phe	Met	Gly	Leu	Ser	Ile	Leu	Leu
		355					360					365			
Ile	Ile	Thr	Leu	Ile	Val	Phe	Asn	Ile	Phe						
	370					375									

<211> 380

<212> PRT

<213> Plasmodium chabaudi

<400> 15

Ala	Gln	Ser	Thr	Asp	Glu	Glu	Val	Lys	Asp	Ile	Leu	Asp	Ala	Phe	Lys
1				5				10						15	
Ser	Glu	Asn	Glu	Tyr	Ile	Tyr	Thr	Lys	Ser	Leu	Gly	Asn	Thr	Tyr	Lys
			20					25					30		
Ser	Phe	Lys	Lys	His	Met	Leu	Lys	Glu	Phe	Ser	Met	Ile	Lys	Glu	Asp
		35					40					45			
Ile	Met	Thr	Gly	Leu	Asn	Tyr	Lys	Leu	Glu	Lys	Arg	Asn	Asp	Phe	Leu
	50					55					60				
Asp	Val	Leu	Ser	Tyr	Glu	Leu	Ala	Leu	Phe	Lys	Asp	Ile	Asn	Thr	Asn
65					70					75					80
Lys	Phe	Val	Val	Lys	Asn	Pro	Tyr	Gln	Leu	Leu	Asp	Asn	Asp	Lys	Lys
				85					90					95	
Asp	Lys	Gln	Met	Ile	Asn	Leu	Lys	Tyr	Ala	Ile	Lys	Gly	Val	Thr	Glu
			100					105					110		
Asp	Ile	Glu	Thr	Ala	Thr	Asp	Gly	Ile	Glu	Phe	Phe	Asn	Lys	Met	Ile
		115					120					125			
Glu	Leu	Tyr	Lys	Pro	Gln	Leu	Asn	Ala	Val	Asn	Glu	Gln	Ile	Ala	Ala
	130					135					140				
Ile	Gly	Thr	Glu	Pro	Thr	Asp	Ala	Glu	Lys	Lys	Lys	Tyr	Ala	Pro	Ile
145					150					155					160
Phe	Glu	Asp	Leu	Lys	Gly	Leu	Tyr	Glu	Thr	Ile	Leu	Asn	Gly	Ala	Glu
			165						170					175	
Glu	Phe	Ser	Glu	Leu	Leu	Gln	His	Lys	Leu	Glu	Asn	Tyr	Lys	Ile	Glu
			180					185					190		
Lys	Ala	Gly	Phe	Asp	Ile	Leu	Met	Ala	Asn	Leu	Glu	Thr	Tyr	Ile	Arg
		195					200					205			
Ile	Asp	Glu	Lys	Leu	Glu	Asp	Phe	Val	Glu	Ser	Ala	Glu	Lys	Asn	Lys
	210					215					220				
His	Ile	Ala	Ser	Ile	Ala	Leu	Asn	Asn	Leu	Asn	Lys	Ser	Gly	Leu	Val
225					230					235					240
Thr	Glu	Gly	Glu	Ser	Lys	Lys	Ile	Leu	Ala	Lys	Met	Leu	Asn	Met	Asp
				245					250					255	
Ala	Met	Asp	Leu	Leu	Gly	Ile	Gly	Ser	Asn	His	Val	Cys	Ile	Ser	Thr

260							265							270						
Ser	Thr	Pro	Asp	Asn	Ala	Gly	Cys	Phe	Arg	Tyr	Asp	Asp	Gly	Thr	Glu					
		275					280					285								
Glu	Trp	Arg	Cys	Leu	Leu	Gly	Phe	Lys	Lys	Asp	Asp	Asp	Gly	Asn	Arg					
	290					295					300									
Cys	Val	Ala	Asp	Asp	Ala	Pro	Val	Cys	Asn	Asn	Asn	Asn	Gly	Gly	Cys					
305					310					315					320					
Asp	Lys	Asn	Ala	Asp	Cys	Arg	Glu	Val	Glu	Asn	Thr	Asp	Arg	Asp	Pro					
				325					330					335						
Ser	Lys	Lys	Ile	Val	Cys	Thr	Cys	Lys	Glu	Pro	Asn	Pro	Asn	Ala	Tyr					
			340					345					350							
Tyr	Ala	Gly	Val	Phe	Cys	Ser	Ser	Ser	Gly	Phe	Met	Gly	Leu	Ser	Ile					
		355					360					365								
Leu	Leu	Ile	Ile	Thr	Leu	Ile	Val	Phe	Asn	Leu	Phe									
	370					375					380									